

A NEW PARASITIC FLY (CUTEREBRIDÆ) FROM THE NORTHERN WHITE-FOOTED MOUSE

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In 1939 at Ames, Iowa, *Peromyscus leucopus noveboracensis* (Fischer) was found to act as host of cuterebrid larvæ. To learn more about this infestation the author carried on extensive trapping of the mouse at Ames between the months of August and November in 1940 and 1941. A fly reared from larvæ taken from these mice proved to be the new species described below.

In 1940 there was an infestation of 38 per cent between September 15 and November 2, and in 1941 the percentage was even higher.* The first stage larvæ probably enter such part of the host as happens to be most convenient. Emasculation was encountered in more than 75 per cent of the cases probably because the scrotal skin is thin and is more apt to come in contact with the eggs or larvæ which, in the writer's opinion, are deposited on the nesting material of the mouse or on the foliage around the burrows.

Cuterebra peromysci new species.

MALE (Holotype)

Length, 15.3 mm. Maximum width of abdomen, 6.2 mm. Mesonotum 4.6 mm. wide; scutellum 2.8 mm. wide, 1.5 mm. long.

Width of cephalic capsule through vertex, 5.4 mm. Distance between eyes at vertex, 1.1 mm. (Ratio 5 to 1.) Outer ocellar triangle raised above level of front. Antennal grooves together forming an oval depression, 1.7 mm. long and 1.5 mm. wide, completely circumscribed, divided down the center by a carina. Carina concave when viewed in profile. Antennal grooves covered with silvery pollen except on ventro-lateral regions which are strongly shining and almost black. Antennæ and aristæ brown. Antennæ covered in part by silvery pollinosity; a cluster of white hairs on both first and second antennal segments. Aristæ ciliate above, with two hairs below on the distal end.

* Dalmat, Herbert T. Infestation of the Northern White-footed Mouse with a New Species of a Parasitic Fly (Cuterebridæ) and Notes on Other Ectoparasites. Unpublished paper, 1941.

Cheek grooves deep. Entire head below cheek grooves white pollinose* and covered with white hair except for two shining areas, a brown one on lower margin of eye and a larger black one about midway between it and mouth. White pollinosity of buccæ extending slightly up the parafacials. Frontal vitta, ocellar triangle, and facial ridge covered with grayish-white pollen. Parafacials, parafrontals, and outer ocellar triangle dark brown and shining; black hairs sparsely covering these areas as well as the frontal vitta and vertex, the hairs more dense on vertex and dorsal region of parafrontals bordering outer ocellar triangle. Oral aperture arch-shaped, the apex at anterior end.

Four white pollinose areas on each side of head. Lowest area in the form of a triangle on parafacial just dorsad to cheek groove, contiguous with inner margin of eye, and continuous with pollen of bucca. Upper three areas forming a triangle, two spots contiguous with inner margin of eye, the small third one near dorsal limit of ptilinal suture. Uppermost spot contiguous with, and extending parallel to, margin of eye between facial depression and vertex; the one below it immediately dorsad and parallel to ridge running laterad from ptilinal suture almost to eye. Occiput completely white pollinose, clothed with white hairs.

Thorax black above with grayish bloom, subopaque; black hairs on dorsal surface approximately 0.5 mm. long, the distance between adjacent hairs about 0.05 mm. Pleura covered by white pollinosity and dense, long, white hairs, the length of hairs about 0.9 mm. A small cluster of black hairs near anterior dorsal corner of mesopleuron; two dark brown shining areas above insertion of anterior coxæ. Legs clothed with black pubescence except for narrow band of white hairs running down outside of femora of forelegs; entirely lacking pollinosity. Pulvilli fuscous.

Abdomen iridescent blue. First segment destitute of pubescence except for single row of white hairs on anterior margin and row of black hairs on posterior margin; entirely covered with faint white pollen.

Second, third, and fourth abdominal segments with white pollen in wide, irregular bands on dorsa, mainly on anterior margins, extending to lateral regions of abdominal segments and ventrally to the borders of the tergites. Pollinosity not symmetrical, interrupted by dark brown shining areas. Hairs on dorsa of these segments black; those on second segment long and slender, increasing in length from the median-dorsal line to the lateral regions, at least twice as long and more flexuous than those on third and fourth segments. Hairs of third and fourth segments approximately 0.2 mm. long, somewhat stiff.

Fifth segment completely encircled by dense white pollen and white hairs except for round, dark, shining areas as on second, third, and fourth segments. Strongly shining black band at extreme posterior margin of segment. White hairs of fifth segment 0.34–0.4 mm. long.

* The pollinosity on *Cuterebra* species is often masked by oil exuding from the bodies. The author found that emersion in chloroform removed the oil from the flies, permitting the actual colors to be seen.

Long white hairs on lateral margins of tergites of fourth and fifth segments.

Sixth segment with sparse white pubescence. Gray pollen in band on posterior border and elsewhere in irregular patches. Microscopic hairs composing pollen longer and slenderer than those composing pollen on other parts of body. Sixth segment well hidden beneath fifth, surrounding genitalia.

Sclerites surrounding genitalia covered with white hairs. Sternites with gray pollinosity and long black hairs.

After studying the descriptions of the known cuterebrids and examining several species in the collection of Myron H. Swenk,* the author finds that the species described above is in the *fontinella* group and is most closely related to *Cuterebra fontinella* Clark and *C. fasciata* Swenk.

C. peromysci is distinguished from *fontinella*, as described by Clark in 1827, by having all the abdominal segments strongly pollinose on the dorsal as well as on the lateral areas, while the abdomen of *fontinella* is pollinose only on the last two segments.

C. peromysci differs from the specimen determined by Swenk as *fontinella* by the pollinosity and pubescence of the abdomen and legs, the hairs of the pleura, and the pubescence of the head. In *fontinella* the lateral areas of the third and fourth abdominal segments and the entire fifth segment are white pollinose, while in *peromysci* all the abdominal segments bear pollen on the dorsal as well as on the lateral areas. The pubescence on the abdomen of *fontinella* is slightly shorter than that on *peromysci*. The legs of *fontinella* are sparsely invested with pollen and lack a band of white hairs on the outside of the anterior femora. There is no cluster of black hairs on the pleura of *fontinella*. The pubescence on the parafacials, parafrontals, face, and frontal vitta of *peromysci* is entirely black while that on the same areas of *fontinella* has several white hairs intermixed.

C. peromysci is definitely distinguished from the holotype (male) of *fasciata* Swenk by the following characteristics: *C. fasciata* significantly more massive than *peromysci*. Pollen absent on the antennæ of *fasciata*, present only on the extreme lower part of the head below the eyes, not extending up the para-

* The writer desires to express his appreciation to Mrs. Myron H. Swenk for permitting him to examine the cuterebrid collection of the late Professor Myron H. Swenk.

facials as in *peromysci*. Pubescence on the parafrontals, parafacials, and frontal vitta of *fasciata* composed mainly of black hairs interspersed with many white ones. Facial depression of *fasciata* not circumscribed below but prolonged into a shiny, brown, elevated area. No pollinose area near the dorsal limit of the ptilinal suture nor any contiguous with the eye between the facial depression and the vertex. Cheek grooves shallow. Outer ocellar triangle not raised as in *peromysci*. No black shiny spot on the lower margin of the eye nor between it and the mouth. Hair on the pleura noticeably shorter than on *peromysci*, no cluster of black hairs on the mesopleuron. Pollen clothing only the fifth abdominal segment and completely encircling it. Lateral margins of the fourth and fifth abdominal tergites without long white hairs.

Type in collection of author. Reared from larva taken by author from *Peromyscus leucopus noveboracensis*, October, 1940, at Ames, Iowa. Adult emerged June 1, 1941.

FIRST INSTAR LARVA.

Length, 4.2 mm.; width, 3.2 mm. Body tapering toward anterior end; anal segment blunt. Twelve segments visible; transverse band of spines on anterior margins of all but first segment, barely discernible on third and fourth segments. Bands wider on ventral surface, with more spines and more rows per band than on dorsal surface. Segments 2 and 5 with narrow bands of spines. Segments 6-12 with bands of about equal width; these bands wider than those on second and fifth segments.

Spines of segments 2, 5, and 6 all pointing posteriorly; other clearly visible bands composed of both anteriorly and posteriorly directed spines, the spines composing front of band directed anteriorly, those of rear portion of band directed posteriorly.

Caudal extremity of maggot ending in a single flat lobe, strongly emarginated, projecting beyond spiracles. Posterior spiracular plate on depressed portion of twelfth segment; each spiracle ending in two slits similar to those of second instar.

Above description based on one specimen taken from a cyst located just anterior to scrotum of host. Larva examined without clearing or mounting. Six other cysts in same mouse mostly around inguinal area.

SECOND INSTAR LARVA.

Body white, elongate; average length, 9.5 mm., greatest width, 3 mm. Segments covered with noncontiguous, flattened scales, some spinose.

Apparent head segment actually two, the cephalic segment very small. Spines ventral to mouth fitting into fold at junction between first and second segments. A number of small spines grouped dorsally on median part of first segment. A dorsal row of spines on each side of second segment extending anteriorly, curving over front of segment 2, then passing ventrally on each side of segment 1.

Segments 3-12 clothed with dark, sharp, single-pointed spines. Anterior margins of segments 3-12 with bands of posteriorly directed spines, the number of spines in each band increasing posteriorly until eighth segment, then decreasing. Spines of anterior row of each band broad; length and width gradually decreasing toward posterior rows of each band. Segment 5 bearing 4 dorsal spines in transverse row near middle of segment. Segment 3 with 3 ventral spines in medial row. Segment 10 bearing on venter 2 groups, each composed of 7-8 small spines, antero-laterad to middle, and interspersed with other spines of segment.

Segments 5-11 also bearing anteriorly directed spines on dorsal surface; segments 8-11 with similar spines on ventral surface. Segment 5 with row of 8 dorsal spines anteriorly directed on median part of posterior border. Dorsa of segments 6-11 with 1-4 rows of anteriorly directed spines on posterior borders. On ventral surface 1-3 rows of anteriorly directed spines on posterior margins of segments 8-10; 5-8 rows on venter of segment 11, increasing to 9-10 rows on the lateral area. Segment 12 well armed with anteriorly directed spines radiating at all angles and completely encircling segment.

Twelfth segment truncate with rounded anal lobe on each side of anus. Posterior spiracles on plates at apex of twelfth segment; each spiracle composed of two slits, the inner one rather straight; the outer one, somewhat serpentine, may be divided into two separate divisions. Spiracular slits lined with small hairs. Length and width of each spiracular plate, 0.12 mm. and 0.18 mm., respectively. Anterior spiracles internal, seen as inconspicuous openings on each side and at base of segment 2.

Cephalo-pharyngeal mechanism shown on Plate III. Length of cephalo-pharyngeal mechanism, 1.1 mm.

Description of second instar larva made from observation of 4 larvæ, 2 dissected and prepared on slides, the others examined in alcohol.

THIRD INSTAR LARVA.

Length of mature larva, 20–25 mm.; width, 7.5–7.8 mm., widest between sixth and eighth segments, tapering toward both ends; weight, 0.83–0.98 gm. Larva coriaceous with imbricated, hollow, tubercled spines arming segments. Spines light in color on immature larvae, dark brown on mature ones.

Head segment small, generally partially retracted. Oral hooks usually protruding from ventrally located mouth opening. Two large anterior lobes with small sensory tubercles separated from each other by median longitudinal furrow. Several rows of small, single-tubercled to 4-tubercled spines fitting into ventral groove-like structure between first and second segments. Some spines on second segment flattened and scale-like, others on segment 2 pointing posteriorly.

Number of rows of spines on segments 3–9 increasing posteriorly, decreasing slightly on segments 10 and 11. Rounded elevations bearing sensory tubercles at irregular intervals among spines. Spines on posterior portion of segments 3–11 pointing anteriorly, mostly single, few multifid. Spines of middle region of each segment flattened and scale-like, any tubercles present facing upward. First 4–6 rows of spines on each segment retrorse, many multifid. Multifid condition occurring mainly on the anterior 2 rows of spines of each segment, the number of tubercles decreasing in posterior rows. Some trifold and 4-tubercled spines found on third, fourth, and fifth rows of spines of each segment. Few simple spines on twelfth segment. Largest spines 0.36–0.41 mm. from base to apex; width at base, 0.25–0.30 mm.

Openings to anterior spiracles on each side near base of second segment, 0.98 mm. long, 0.4 mm. wide. Spiracles everted during formation of puparium. Posterior spiracular plates occupying central part of twelfth segment, kidney-shaped, 0.91 mm. long.

0.33 mm. wide, each perforated by three markedly sinuous slits, lined on entire periphery with fine hairs which might act as filters. Plates darker and division between them less distinct in mature larva. Twelfth segment retracted in preserved specimens, lighter in color than rest of integument. Large round anal lobe on each side of anal opening.

Paired mandibular sclerites exposed anteriorly and ventrally at extreme anterior part of cephalo-pharyngeal mechanism; sclerites curving ventrally within thoracic segments and tapering toward ventral articulations for the muscles moving hooks. Paired dentate sclerites articulating with bases of mandibular sclerites. Hypostomal sclerites articulating with dentate sclerites anteriorly and with pharyngeal sclerites posteriorly. Transverse bridge crossing hypostomal sclerites on ventral side; a small foramen through middle of hypostomal bridge. Pharyngeal sclerites divided into paired dorsal and ventral cornua. Entire cephalo-pharyngeal mechanism 2.5 mm. long. Paired chitinous structure of unknown function lying parallel and ventral to mandibular hooks.

Above description made from examination of 16 larvæ just before pupation. Several were cleared, the various parts mounted; others examined in alcohol. The usual method of treating the integument with KOH until sufficiently bleached removed tubercled spines, only flattened scales remaining. Leaving the integument in KOH for a relatively short time, dehydrating, then clearing in glycerin and mounting in glycerin jelly obviated this difficulty.

PUPARIUM.

Puparium black, consisting of dried and much hardened larval skin.

Average length, width, and weight determined from 14 puparia, 19 mm., 9.1 mm., and 0.73 gm., respectively. Distinct loss of weight evident in formation of puparium from third instar larva; a more spherical shape also assumed, probably preventing excessive loss of water during winter.

Stouter in middle and posterior, widest at seventh and eighth segments. Ten segments distinctly visible, the cephalic and spiracular segments retracted so that they are not seen. At fold

between segments 2 and 3, two light brown, column-like tubercles project from the integument which are the everted anterior spiracles of third instar larva. Entire puparium clothed with imbricated spines displaying tuberculation as in third instar larva.

During emergence of fly, the dorsa of the first 5 segments detach perfectly in single piece or cap. Puparium lined with thin, white, silken membrane.

PLATE III

Upper: Lateral view of right half of cephalo-pharyngeal mechanism of third instar larva of *Cuterebra peromysci*; de, dorsal cornu; ve, ventral cornu; h, hypostomal selerite; da, dorsal arch; d, dentate selerite; m, mandibular hook; natural length, 2.5 mm.

Lower: Left—Group of three spines from second instar larva; greatly enlarged. Right—Group of spines from third instar larva, showing multifid spines and flattened scale; greatly enlarged.

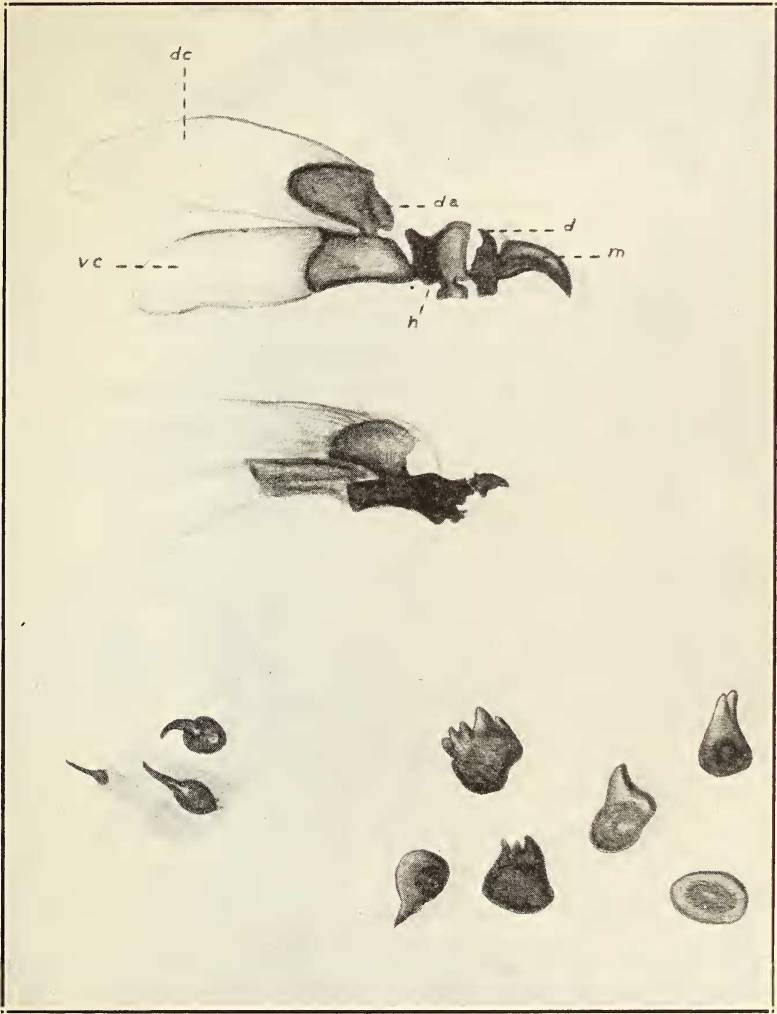


PLATE IV

Anterior view of head segments of third instar larva; A. sp, anterior spiracle; an. pr, antennal prominence; g, cephalic or first segment; st, sensory tubercle; sh, sheath over mandibular hook; mu. s, multifid spines; m, mandibular hook; greatly enlarged.

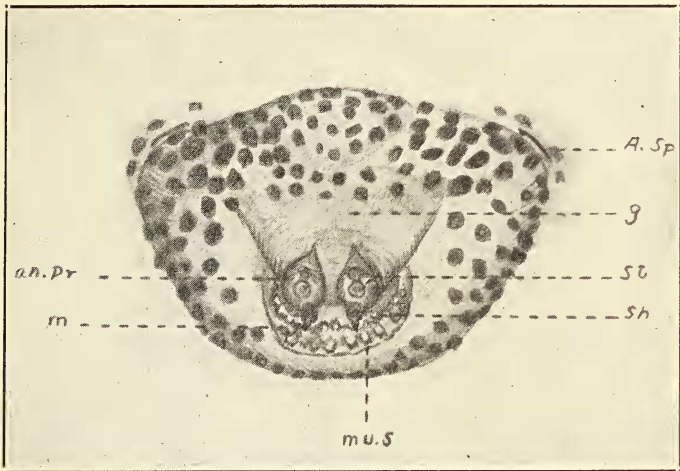


PLATE V

Upper: Cephalic segments of third instar larva viewed from within; hb, hypostomal bridge; h, hypostomal sclerite; tr, trachea; a. sp, anterior spiracle; ve, ventral cornu; de, dorsal cornu; f, second segment; g, first segment; an. pr, antennal prominence; m, mandibular hook; greatly enlarged.

Lower: Chitinous structure of unknown function found beneath the mandibular hooks, lying parallel to them; greatly enlarged.

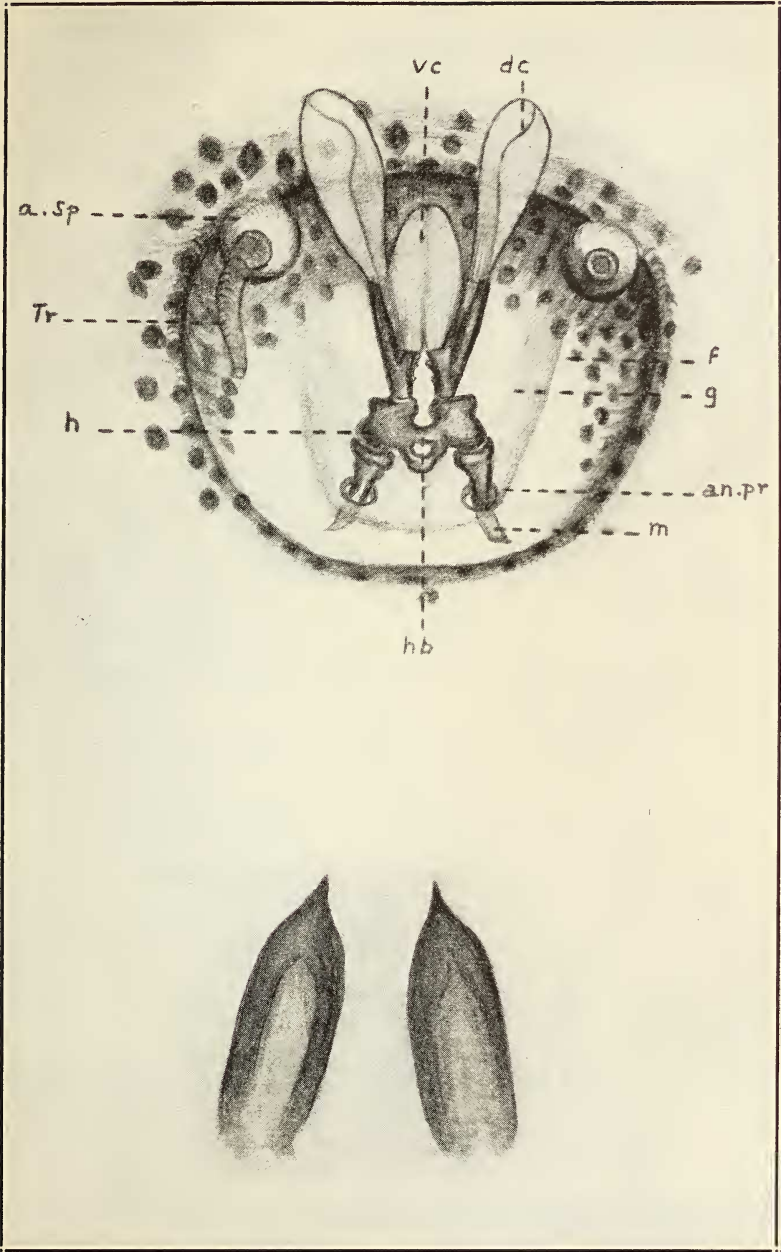


PLATE VI

Upper: Posterior view of eleventh and twelfth segments of third instar larva, showing the posterior spiracular plates and the spiracles; st, sensory tubercle; p, peritreme; b, eleventh segment; but, button; pl, twelfth segment; sp. op, spiracular opening; an. 1, anal lobe; greatly enlarged.

Lower: Posterior view of twelfth segment of second instar larva, showing posterior spiracular plates and the spiracles; note that left spiracle is divided into three external apertures while the right is divided into only two; openings lined with hairs as in third instar; same parts as for above; greatly enlarged.

